

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

I. Introduction

Claims 96-110 and 129 are requested to be cancelled. Claims 111, 120, 121 and 130 are currently being amended. The limitation from allowable claim 129 is incorporated into independent claim 111. New claims 133 to 146 are added. Support for the new claims may be found throughout the specification and in previously filed claims 111-132. No new matter was added. After amending the claims as set forth above, claims 111-128 and 130-146 are now pending in this application. No new matter was added.

II. Allowable Subject Matter

Applicants appreciate the indication that claim 129 would be allowed if rewritten in independent form. In response, the limitation from claim 129 has been incorporated into claim 111. Applicants respectfully submit that claims 111-128 and 130-132 are now in condition for allowance.

III. The Prior Art Rejections Should Be Withdrawn

Claims 96-100, 102, 103, 108-115, 117, 118, 123-126 and 132 are rejected under 35 USC 102(e) as being anticipated by Kub (6,323,108). Claims 101, 104-107, 116, 119-122, 127 and 123 are rejected under 35 USC 103(a) as being obvious over Kub in view of Gosele (J. Vac. Sci. Technol.).

A. Claim 111

Applicants respectfully submit that these rejections have been rendered moot by the cancellation of claims 96-110 and the incorporation of the limitation from allowable claim 129 into independent claim 111.

B. Claim 134

New independent claim 134 is added. Claim 134 recites “bonding the device substrate to the handle substrate to form a bonded interface having the low resistance electrical contact which exhibits ohmic characteristics.” This limitation was recited in claim 128 and on page 12, last paragraph of the specification. Ohmic characteristics mean that the interface exhibits linear current-voltage operating characteristics at least in the normal device operating range. This is shown in Figure 1 of the parent application serial number 10/125,133, which is incorporated herein by reference in its entirety.

Page 4, last paragraph of the Office Action suggests that the HF-dip treatment disclosed in Gosele would form hydrophobic substrate surfaces suitable for bonding in the process of Kub. The Office Action concludes that the bonded hydrophobic surface would inherently result in an ohmic or low resistance interface. Applicants respectfully disagree.

As noted in MPEP 2112(IV), “To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.’” *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)”. In the present case, the hydrophobic surface bonding in the process of Kub would not necessarily result in an ohmic interface.

As noted in col. 7, lines 50-52 of Kub, hydrophobic surfaces result in weak hydrogen van der Waals bonding. Thus, bonded hydrophobic surfaces of Kub do not produce strong covalent bonds. For example, col. 1, lines 57-62 of U.S. Patent 7,019,339, which issued from

parent application serial number 10/125,133, states that for Ge/Si surfaces, an anneal at a temperature of at least 600 °C before exfoliation is needed to convert weak van der Waals bonding into strong covalent bonding. The strong covalent bonding contributes to the ohmic interface.

In contrast, Kub does not teach or suggest an annealing step to convert weak hydrogen van der Waals bonding into strong covalent bonding prior to exfoliating the device film. Thus, the bonded interface of Kub is not necessarily ohmic.

Furthermore, as noted on pages 12-13 of the present specification, a pre-bonding baking or annealing step eliminates the absorbed wafer from the bonded surfaces. This also contributes to the ohmic interface. In contrast, Kub does not teach or suggest such a step.

Still further, page 15 of the present specification describes a silicon bonding layer located between the device and handle substrates. This layer ensures a strong bond between the substrates and allows an ohmic contact to be formed between the substrates. Kub does not teach or suggest such a silicon bonding layer.

Finally, col. 6, lines 23-25 of U.S. Patent 7,019,339 teaches highly doped device and handle substrates to minimize junction depletion width at the interface. This doping also contributes to the ohmic interface. In contrast, Kub does not teach or suggest a highly doped device and handle substrate.

Thus, the bonded interface of Kub is not necessarily or inherently ohmic. The interface of Kub is most probably not even close to being ohmic because Kub does not teach any of the features which contribute to an ohmic interface.

Therefore, Kub and Gosele do not teach or suggest an ohmic interface as recited in claim 134.

IV. 112 Rejections Should Be Withdrawn

Claims 96-132 are rejected under 35 USC 112, para. 2 as being indefinite. Claims 96-110 have been cancelled rendering the rejection moot. With respect to claim 111, step (1) of

treating prepares the surface for the future formation of the low resistance electrical contact. However, the low resistance electrical contact is not formed during the step of treating. Instead, the low resistance electrical contact between the device substrate and the handle substrate is formed after step (2) of bonding the device substrate to the handle substrate. Step (2) of claim 111 has been amended to clarify this. Applicants respectfully request that the rejection be withdrawn.

V. Double Patenting Rejection

Claims 96-132 are rejected under the doctrine of obviousness type double patenting over claims 36-51 US patent number 7,019,339. In response, a terminal disclaimer is provided herewith to overcome the rejection.

Claims 96-132 are provisionally rejected under the doctrine of obviousness type double patenting over claims of co-pending applications 11/004,808 and 11/004,948 in view of Gosele. Applicants respectfully request that this rejection be withdrawn or held in abeyance because applications 11/004,808 and 11/004,948 have not issued as patents yet. Thus, the claims of those applications may change significantly during prosecution, obviating the need for a terminal disclaimer. Applicants respectfully submit that after the present application issues as a patent, an obviousness type double patenting rejection can still be made in the 11/004,808 and 11/004,948 applications, if appropriate, and a terminal disclaimer filed in those applications. Furthermore, since the present application and the 11/004,808 and 11/004,948 applications all claim priority to the 7,019,339, all three applications have the same twenty year patent term and a terminal disclaimer would not change the patent term of the present application.

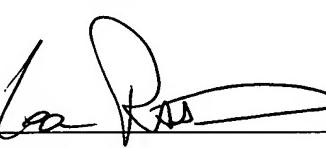
VI. Conclusion

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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By 

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